AMENDMENTS TO THE SPECIFICATION:

Please, after page 9, line 13, add the following:

Figure 5F is an example of an embodiment of components used for a chopper and AC coupling.

Please amend the paragraph beginning at page 25, line 23 as follows:

Referring now to Figures 3A, 4A, 4B and 4C, operation of an embodiment 1000 of a High Voltage Control Loop 1000 and Power Supply 1500 is described. Figures 4A, 4B and 4C provide more detail of components included in Figure 3A. In particular, Figure 4A is an example of a schematic including the KV Error Processing 128 and the KV Monitor Output Filter 132. Figure 4B is an example of a schematic including the Resonant Converter [[128]] 108. Figure 4C is an example of a schematic including the HV Multiplier Block 118.

Please amend the paragraph beginning at page 27, line 4 as follows:

In the particular embodiment of Figure 4A, transient behavior of the system may be acceptable for an intended application or use without a need for including a derivative feedback. Consequently, the particular components and/or connections described herein for use with the derivative feedback are not used in this embodiment described herein and are rather indicated in Figure 4A with component values of do-not-populate (DNP). However, an embodiment utilizing derivative feedback may also utilize these components in another embodiment. Provisions for the components in the circuit architecture are provided to allow for maximum flexibility in tailoring the control loop response to the specific requirements of particular applications and embodiments. The integral of the error is developed through [[R50]] R70 and C45. Integral feedback is utilized to eliminate any residual DC offset error which may otherwise occur between the requested input value 100 (KV_CTRL) and the actual value as indicated by 104 (KV_FDBK). Scaled versions of the proportional, integral and derivative of this error are developed and combined by the operation of U17A to produce the error signal 106, (KV_ERROR). This PID architecture permits high accuracy, stability and fast transient response of the control loop to be realized. In different embodiments, various combinations of

proportional, integral and derivative feedback may be utilized to achieve different control loop response characteristics.

Please amend the paragraph beginning at page 28, line 10, as follows:

Referring now to Figure 4B, the error signal 106 is applied to the input of a resonant converter 108. The resonant converter 108 includes components U9, U10, and U11 . The resonant converter 108 functions to provide an amplitude modulated sine wave drive to the primary side input of the high voltage step up transformer 136. The inductance of the transformer 136 primary in conjunction with the reflected secondary-side inductance resonate with capacitor C2 and the added capacitance of the transformer 136 reflected secondary-side capacitance. This resonance results in a sinusoidal waveform applied to the transformer primary input terminals 110 and [[112]] <u>113</u>. Alternatively switching U9-2 and U9-4 by U10-2 and U10-1 respectively at the resonant frequency provides the means to sustain the oscillation. The oscillation frequency is sensed by 114 and provided as an input at U10-9. Switching occurs during the zero-crossing of the sinusoidal waveform to achieve minimum power loss during the switching transitions.

Please amend the paragraph beginning at page 31, line 20, as follows:

Referring now to Figures 3B, 5A, 5B and 5C, operation of an embodiment 2100 of a Beam Current Control Loop 2000 and Filament Transformer and X-Ray Tube 2500 is described. Figures 5A, 5B and 5C provide more detail of components included in Figure 3B. In particular, Figure [[5B]] <u>5A</u> is an example of a schematic including the BC Error Processing 210 and BC Monitor Output Filter 214. Figure 5B is an example of a schematic including the Filament Drive 218 and Chopper and AC Coupling 220. Figure 5C is an example of a schematic including the Filament Transformer and X-Ray Tube 2500.

Please amend the paragraph starting at page 32, line 4, as follows:

In the operation of the Beam Current Control Loop 2000, an input control signal, 200, (BC_CTRL) establishes the desired X-ray tube beam current output. A feedback signal voltage,

204, (BC_FDBK), developed from the beam current by passing it through a beam current sense resistor 206 to ground is applied to the positive input of an instrumentation amplifier [[206]] at U4-3. To achieve high accuracy control of the beam current, resistor 206 may be preferrably specified with an extremely tight tolerance and excellent temperature stability. In this embodiment, the beam current sense resistor 206 is physically located in close proximity to U4. Consequently, ground sensing and correction is not employed, as there is no significant difference between the ground level at the bottom 206 and the ground reference point at U4-2. In other embodiments, the beam current sense resistor 206 may be located at some distance from U4, possibly in the high voltage power supply or in proximity to the X-ray tube. In these embodiments it may be desirable to employ a similar ground sensing and error correction approach as may be employed for the high voltage circuit 1100. Specifically, U4-2 may be directly connected to the grounded end of 206 instead of local ground.

Please amend the paragraph starting at page 37, line 15, as follows:

In the configuration [[4000]] <u>4002</u>, the high voltage sense resistive divider 122 is connected to the top of 206 as shown, rather than being connected directly to ground (as in Figure 5E), which causes all of the returning beam current to flow through 206. In this manner an accurate measure of beam current can be made. The polarity of 204 (BC_FDBK) is inverted from the polarity of the voltage which results from the configuration in Figure 5E. Consequently, when using the configuration 4002 of Figure 5E, the connections at the inputs of U4-2 and U4-3 (Figure 5A) are reversed for proper operation. For accurate measurement of high voltage, the differential voltage across the bottom part of the high voltage divider 122 is measured. This can be accomplished at instrumentation amplifier 130 (Figure 4A) by connecting instrumentation amplifier 130 pin U18-2 directly to 204 (BC_FDBK) thereby breaking the connection to 124 (KV_GND_SENSE). In this manner, the voltage drop across 206 is subtracted from 104 (KV_FDBK) to create the corrected feedback signal 126 at U18-6.